

Patent Claims:

1 1. Tri-axial monolithic acceleration sensor (1), which  
2 comprises the following characteristic features:

3 a) the acceleration sensor (1) consists of plural  
4 individual sensors (2a-d) with respectively a main  
5 sensitivity axis (11) arranged on a common  
6 substrate (8),

7 b) each individual sensor (2a-d) is rotatably movably  
8 suspended on two torsion spring elements (4a-h) and  
9 comprises a seismic mass (3a-d) with a center of  
10 gravity ( $S_a$ ,  $S_b$ ,  $S_c$  and  $S_d$ ),

11 c) each individual sensor (2a-d) comprises means for the  
12 measurement (10) of the deflection of the seismic mass  
13 (3a-d),

14 characterized in that

15 d) the acceleration sensor (1) consists of at least three  
16 identical individual sensors (2a-d),

17 e) each individual sensor (2a-d) is suspended  
18 eccentrically relative to its center of gravity ( $S_a$ ,  
19  $S_b$ ,  $S_c$ ,  $S_d$ ) and

20 f) is rotated relative to the other individual sensors  
21 (2a-d) by 90°, 180° or 270°.

1 2. Acceleration sensor according to claim 1, characterized in  
2 that the at least three identical individual sensors (2a-d)  
3 are arranged in a rectangle.

3. Bi-axial monolithic acceleration sensor (1), that comprises the following characteristic features:

- a) the acceleration sensor (1) consists of two individual sensors (2a-d) with respectively a main sensitivity axis (11) arranged on a common substrate (8),
- b) each individual sensor (2a-d) is rotatably movably suspended on two torsion spring elements (4a-h) and comprises a seismic mass (3a-d) with a center of gravity ( $S_a$ ,  $S_b$ ,  $S_c$  and  $S_d$ ),
- c) each individual sensor (2a-d) comprises means for the measurement (10) of the deflection of the seismic mass (3a-d),

characterized in that

- d) the acceleration sensor (1) consists of two identical individual sensors (2a-d),
- e) each individual sensor (2a-d) is suspended eccentrically relative to its center of gravity ( $S_a$ ,  $S_b$ ,  $S_c$ ,  $S_d$ ) and is rotated by  $180^\circ$  relative to the other individual sensor (2a-d) and
- f) the main sensitivity axis (11) of the one individual sensor (2a-d) extends vertically to the substrate (8) and the main sensitivity axis (11) of the other individual sensor (2a-d) extends vertically to the substrate (8).

4. Acceleration sensor according to claim 1, 2 or 3, characterized in that the substrate (8) is arranged between a lower cover disk (7) and an upper cover disk (9) for the

- sealing and for the protection against environmental influences.

5. Acceleration sensor according to one of the claims 1 to 4, characterized in that the deflection of each seismic mass (3a-d) is achieved by means of a differential capacitive measurement.

6. Acceleration sensor according to claim 5, characterized in that metallized surfaces (10a-d) that are isolated from one another are structured on the upper cover disk (9) close to the torsion axis defined by the respective torsion spring element (4a-h) for the differential capacitive measurement.

7. Acceleration sensor according to claim 6, characterized in that the surfaces (10a-d) are arranged symmetrically to the torsion axis defined by the respective torsion spring element (4a-h).